SETTING DEVICE FOR SAWBLADES

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Inventor(s): ALBINSSON GOERAN [SE]
Applicant(s): KAPMAN AB [SE]; ALBINSSON GOERAN [SE]
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WO02066192 (A8)
US2004168551 (A1)
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TW508278 (B)
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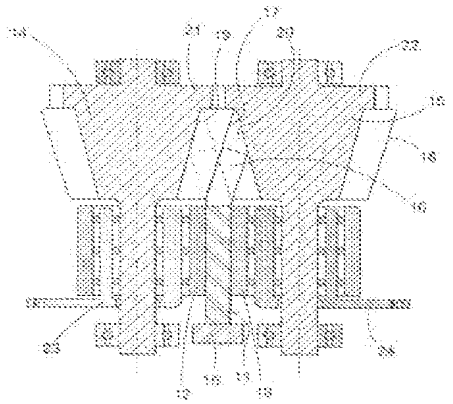
Abstract of **WO 02066192 (A1)**

Setting device for sawblades, where a saw tooth (10) to be set is bent by contact with a ridge (17) on one among two conical detting rollers (14, 15), while the sawable is squeezed between two cydrical pressure rollers (12, 13) with axes which are parallel to the setting rollers but controllably displaceable, and the rotation of the setting rollers is adapted to the velocity of the sawblade by measuring the passage of the saw teeth past a measuring device and comparing with the angular position of the setting rollers.



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(71) Applicant *(for all designated States except US)*: **KAP-MAN AB** [SE/SE]; S-811 81 Sandviken (SE).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **ALBINSSON, Göran** [SE/SE]; Gamla Läckövägen 46, S-531 55 Lidköping (SE).

(74) Agents: **AXELSSON, Nils, Åke** et al.; Groth & Co.KB, Box 6107, S-102 32 Stockholm (SE).

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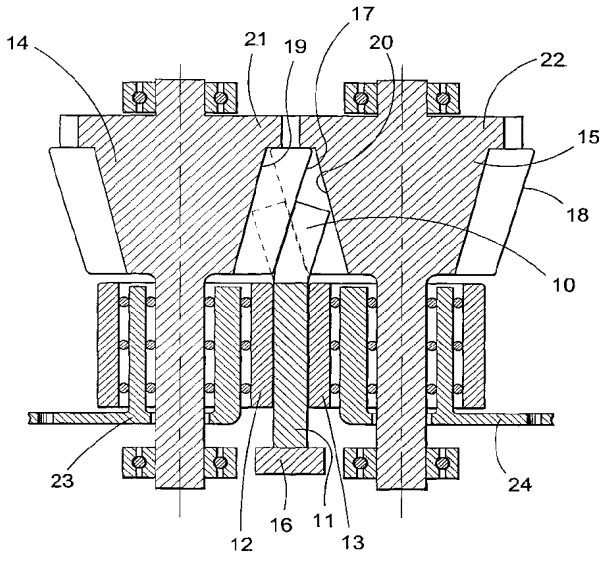

(57) Abstract: Setting device for sawblades, where a saw tooth (10) to be set is bent by contact with a ridge (17) on one among two conical detting rollers (14, 15), while the sawable is squeezed between two cydrical pressure rollers (12, 13) with axes which are parallel to the setting rollers but controllably displaceable, and the rotation of the setting rollers is adapted to the velocity of the sawblade by measuring the passage of the saw teeth past a measuring device and comparing with the angular position of the setting rollers.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

SETTING DEVICE FOR SAWBLADES

Background

Sawblades for wood or metal are commonly made with individually set teeth, where the teeth have been shaped by plunging, grinding or milling, followed by pressing to the right or left by impact devices while the sawblade is stationary. The motion of the impact devices may be rectilinear or arcuate. If each impact device presses a single tooth, the same impact device may be used for sawblades with different pitch distances, but that requires a long time since the sawblade must be moved and stopped for every tooth. It is also possible to make the impact devices such that each impact device will press a group of teeth at each impact, as described in the publication EP 0 742 067. This allows a faster setting operation since the displacement will be as long as the group of teeth, and the setting to the right and to the left may occur simultaneously, but the impact devices must be powerful, and a change of the number of teeth in the group will require a change of impact device, and it may be difficult to control the precision in setting angle within a group. The time will generally be longer for such sawblades for metal that have small and many teeth. Therefore, such sawblades are often made with wave setting as described in the publication GB 1,123,426, where the sawblade is pulled with a constant velocity between two rollers with undulating conical periphery without stopping during the setting operation. Such sawblades have a low production cost and less risk of deformation of the corners of the teeth than if they had been set with impact devices, but they will be less efficient since in general only one corner of each tooth will be able to cut chips.

The present invention concerns a new setting device for a method which combines the short production time of the wave setting with the precision of the individual setting, and which allows a simple adaptation to sawblades with different thicknesses and different spring-back after setting. The method allows different setting patterns, also with a systematic variation of the setting width or with a variable pitch distance.

Description of the figures

The invention will be described with reference to the figures, where

Figure 1 shows a cross-section through a setting device according to the invention, and

Figs. 2 and 3 show alternative embodiments of the setting rollers as seen from above, fig. 2 where all teeth are set alternatingly right and left, fig.3 where every second tooth remains straight without setting.

Description of the invention

A setting device according to the invention is primarily intended for use on sawblades of constant and restricted width, such as bandsaw blades and hacksaw blades.

Figure 1 shows a cross-section of the sawblade (11) as it moves while squeezed between two pressure rollers (12,13) and two setting rollers (14,15) while the back of the sawblade faces downwards and slides against a supporting rail (16) or a corresponding supporting device. The setting rollers (14,15) are made with raised ridges (17,18) and between them grooves (19,20) which are so deep that where a tooth (10) upon a sawblade is contacted and deformed by a ridge (17) on the one setting roller (14), the corresponding groove (20) on the other setting roller (15) should be so deep that the tooth will not touch the bottom of the groove. The shape of the ridges may be chosen to fit the intended shape of the tooth after setting, and may preferably have a convex or rounded edge to avoid sharp impressions which may disturb the chip flow or be a starting point of cracks. The angular distances between the ridges do not have to be equal, but may be chosen to correspond to the tooth pitch in a group of teeth with variable pitch.

The contact with the setting rollers should not contribute to the forward feeding of the sawblade, which is preferably fed by a separate feed mechanism in front of or behind the setting rollers. This makes it possible to adjust the rotational speed of the setting rollers relative to the feed mechanism in order to ensure that each ridge (17,18) contacts the corresponding tooth (10) in the correct position. This is possible by measuring the position of the front edge of each approaching tooth optically or mechanically, and comparing with the angular position of the setting rollers. As described in the publication EP 0 742 067 it is known that such measuring of the tooth position may be used to indicate incorrect tooth positions due to damage during shaping of the teeth or errors in welding of bandsaws, and it

is then described that such an indication is to be followed by interrupting of the production and readjustment of the machine. According to the present invention, a deviation of the tooth position may instead be compensated for without any stop by a temporary increase or decrease of the velocity of the feed relative to the setting rollers.

The setting rollers (14,15) are forced to follow the angular position of each other with the same rotational velocity by means of gear segments (21,22) which may be made integral with the setting rollers, possibly as extensions of the ridges (17,18), or as separate gears fixed to the setting rollers.

Immediately below the setting rollers there are two pressure rollers (12,13) which are pressed against the sawblade and which are freely rotatable around axes parallel to but slightly displaceable from the axes of rotation of the corresponding setting rollers, such as by use of an intermediate bearing made as eccentric tubular elements (23,24) which may be rotated by external means, manually or automatically. Hereby it is possible to compensate for variations of the thickness of the sawblade, and to adjust the position of the sawblade between the setting rollers to get the intended relation between the setting width to the right and the left, in most cases equal, but for saw blades for special use also unsymmetric. The pressure rollers (12,13) are in the simplest case cylindrical, but are preferably made with a rounded upper edge to allow the setting to produce a well defined bending zone without stress concentration. The height of the supporting rail (16) is also adjustable, which makes it possible to increase or decrease the setting width if it does not correspond to the specified value by raising or lowering the supporting rail also during ongoing setting. By making the distance between the setting rollers and the pressure rollers small, it is ensured that the ridges (17,18) will contact a large portion of the height of the tooth (10), thereby avoiding local deformation of the corners of the tooth.

It is already known from bandsaw blades for wood that the blade material adjacent to the toothless edge can be compressed by rollers to create built-in compressive stresses, which makes the sawblade slightly curved, resulting in better stability and better precision in sawing. According to known technology, this is done in a separate machine, but according to the invention the same result is achieved by using pressure rollers which are slightly conical or have a diameter which is slightly increased at the lower edge.

Since the pressure rollers may be individually offset it is possible to compensate and counteract tendencies of the sawblade to become curved after the setting due to built-in stresses remaining from the manufacture of the raw strip material.

The setting device may also be used for sawblades with variable width but straight tooth-line, either by making them initially with constant width until they are given the final width variation after the setting and by punching, or by having them supported and fed during passing through the setting device by a strip with cut-outs of such a shape that the lower edge of the strip running against the supporting rail will be parallel to the tooth line of the sawblade.

Naturally, the setting device may also be used for manufacture of traditionally wave-set sawblades, but offers then only the advantage that the symmetry between right and left-set teeth may be easily adjusted and guided by offsetting the pressure rollers.

Within the frame of the invention are also such simple variations using known technique as offsetting the pressure rollers by other means than eccentric bearings, such as linearly, or providing the supporting rail with one or more rollers, or synchronising the setting rollers by other means than gear segments such as by coupling rods or helical gear, or feeding the sawblade by use of powered pressure rollers. The setting device could also be turned around to have the supporting rail above or at the same level as the sawblade.

CLAIMS

1. Setting device for sawblades where each saw tooth (10) to be set is bent by contact with a ridge (17) on one of two setting rollers (14,15) rotating with identical rotational velocity, **characterized** by said setting rollers (14,15) being conical, and by the sawblade below the teeth being squeezed between two cylindrical pressure rollers (12,13) the rotational axes of which are parallel to the axes of the setting rollers but displaceable relative to those, the axis of a first one of the said setting rollers (14,15) extending through a first one of the said pressure rollers (12,13) and the axis of a second one of the said setting rollers (14,15) extending through a second one of the said pressure rollers (12,13).

2. Setting device according to claim 1, **characterized** by the pressure rollers (12,13) being displaceable by means of adjustable eccentric devices (23,24).

3. Setting device according to claim 1, **characterized** by the rotation of the setting rollers being adapted to the velocity of the sawblade by measuring the passage of the saw teeth past a measuring device and comparing with the angular position of the setting rollers.

4. Setting device according to claim 3, **characterized** by the angular distance between ridges being varied to let each ridge contact a certain tooth in a group of teeth with variable pitch distance.

5. Setting device according to claim 1, **characterized** by the vertical position of the sawblade while passing between the setting rollers being adjustable by means of a vertically adjustable supporting rail (16).

6. Setting device according to claim 1, **characterized** by the pressure rollers (12,13) being made with larger diameter adjacent to their lower edges where they contact the toothless edge of the sawblade.

7. Setting device according to claim 1, **characterized** by the pressure rollers (12,13) being individually displaceable.

Fig. 1

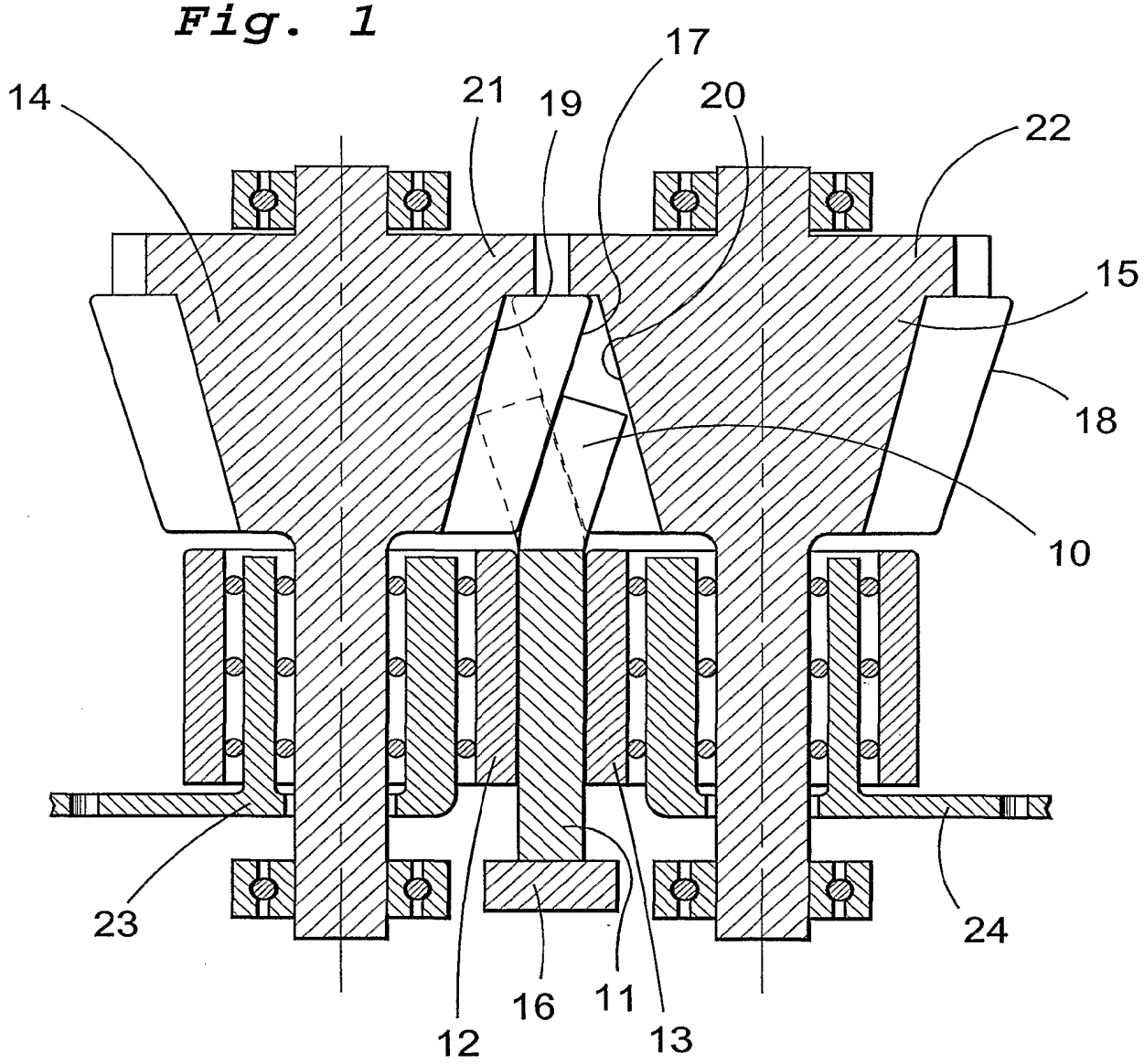


Fig. 2

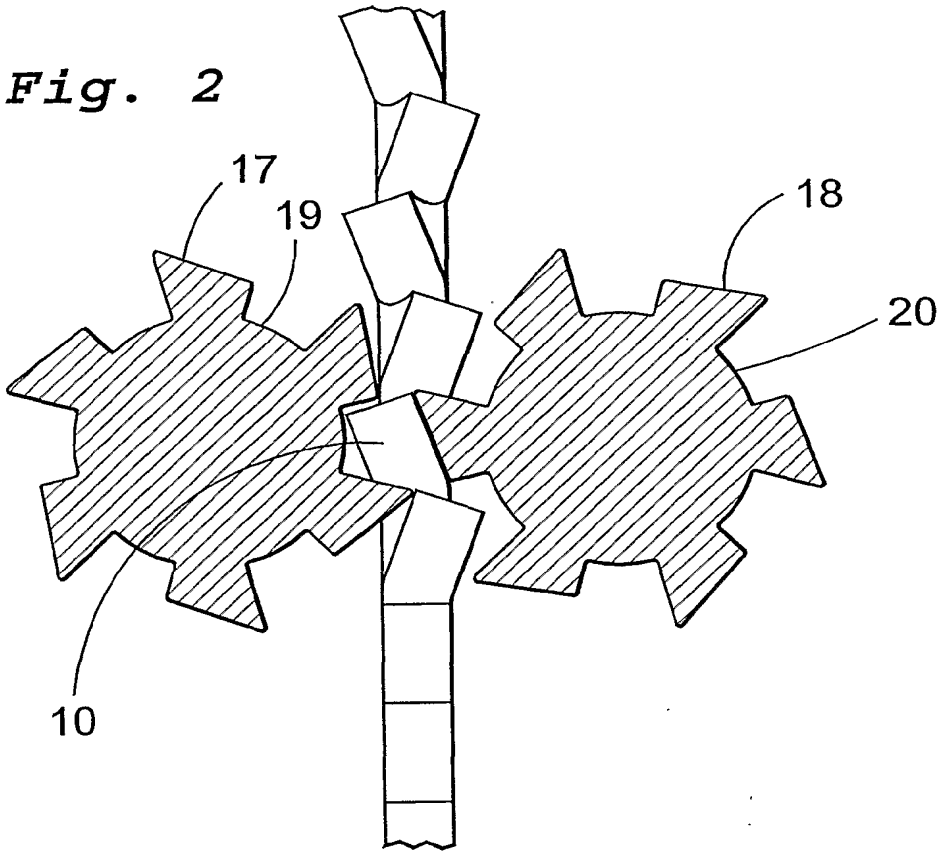
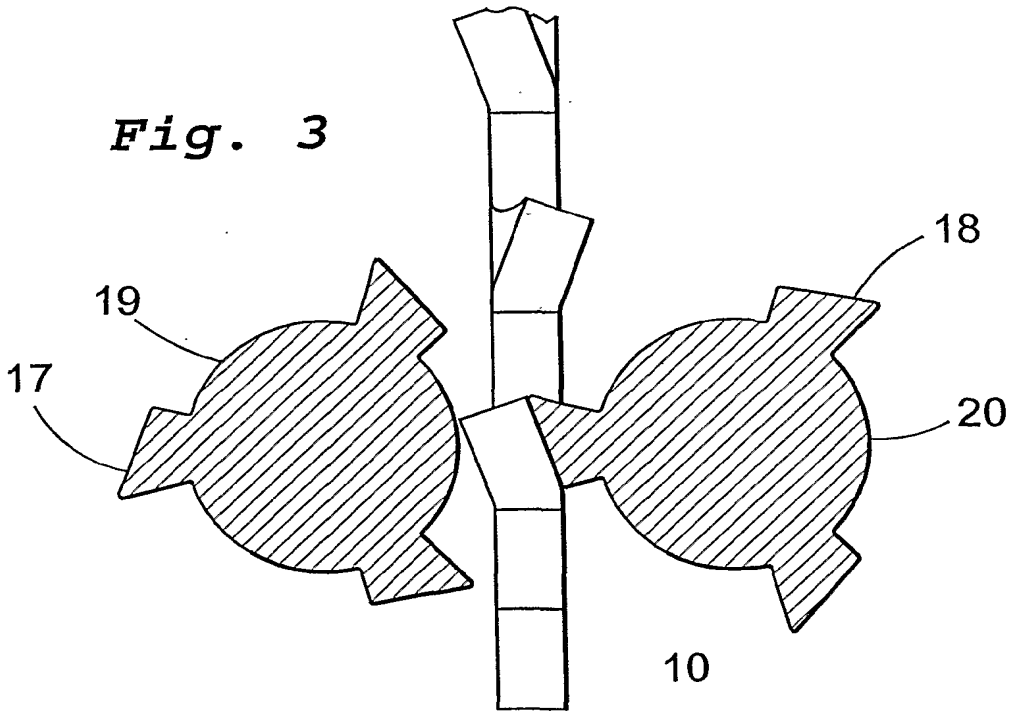


Fig. 3



INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER

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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 582185 C (JOSEPH HEINZMANN), 27 July 1933 (27.07.33), page 1, column 2, figures 1-3 --	1-7
A	DE 83717 C (BURKHARD WENNINGER), 21 March 1895 (21.03.95), figures 1,2, page 1, column 2, first paragraph --	1-7
A	DE 1090492 B (COBURGER HOLZBEARBEITUNGSMASCHINENBAU G.M.B.H.), 6 October 1960 (06.10.60) --	1-7
P,A	US 2001000325 A (YAMASHITA), 19 April 2001 (19.04.01) --	1

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,A	US 2001003355 A1 (HEINE), 14 June 2001 (14.06.01), figures 1-4, page 1, paragraph [0003] --	3
P,A	US 2001003256 A (HEINE), 14 June 2001 (14.06.01), claims 1,3,8,10 --	1

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/SE 02/00280

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DE 1090492 B	06/10/60	NONE	
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